WHAT IS CLAIMED IS:

1. An optical transmission system comprising:

a transmitter outputting signal light in which a plurality of signal channels with an optical frequency spacing of 400 GHz or more but 12.5 THz or less are multiplexed;

an optical fiber transmission line transmitting the signal light; and

Stimulated-Raman-Scattering means including at least part of said optical fiber transmission line as an optical fiber for Raman amplification, and Raman-amplifying the signal light by supplying Raman amplification pumping light.

2. A system according to claim 1, wherein a signal channel spacing in the signal light is 10 nm or more.

3. A system according to claim 1, wherein said Stimulated-Raman-Scattering means includes a lumped Raman amplifier.

4. A system according to claim 3, wherein said lumped Raman amplifier has a structure for guiding excess Raman amplification pumping light to an external transmission line section of said optical fiber transmission line, which is located outside said lumped Raman amplifier, so as to use said transmission line section as said optical fiber for Raman amplification.

5. A system according to claim 1, wherein said Stimulated-Raman-Scattering means is arranged at least at one of the transmission end and reception end of the signal light in said optical fiber transmission line.

6. A system according to claim 1, wherein, of said optical fiber transmission line, at least a transmission line section functioning as said optical fiber for Raman amplification has a negative chromatic dispersion in a wavelength band where the plurality of signal channels of the signal light are present.

7. A system according to claim 1, wherein, of said optical fiber transmission line, at least a transmission line section functioning as said optical fiber for Raman amplification includes an optical fiber with a loss peak of 0.33 dB/km or less due to OH-radicals near a wavelength of 1.39 μm.

8. A system according to claim 1, wherein a pumping channel for Raman amplification is present between adjacent signal channels of the plurality of signal channels contained in the signal light.

9. A system according to claim 1, wherein said Raman amplification means by Stimulate-Raman-Scattering Raman-amplifies, of the plurality of signal channels contained in the signal light, a signal channel in a wavelength range where a transmission loss in said optical fiber transmission line is not less than a

first threshold value.

10. A system according to claim 1, further comprising a dispersion compensating means compensating for a chromatic dispersion of a signal channel, of the plurality of signal channels contained in the signal light, in a wavelength range where an accumulated chromatic dispersion in said optical fiber transmission line is not less than a second threshold value.

11. An optical transmission system comprising:

a transmitter outputting signal light in which a plurality of signal channels with an optical frequency spacing of 400 GHz or more but 12.5 THz or less are multiplexed;

an optical fiber transmission line transmitting the signal light; and

Stimulated-Raman-Scattering means including at least part of said optical fiber transmission line as an optical fiber for Raman amplification, includes a pumping light source which supplies Raman amplification pumping light containing at least one pumping channel multiplexed to part of said optical fiber transmission line, and Raman-amplifying the signal light by supplying the Raman amplification pumping light,

wherein an optical frequency of each pumping channel contained in the pumping light is so set as to locate a peak of Raman gain at an optical frequency

different from an optical frequency of each signal channel contained in the signal light.

12. A system according to claim 11, wherein the optical frequency of each pumping channel contained in the pumping light is so set as to locate the peak of Raman gain at an optical frequency separated from the optical frequency of each signal channel contained in the signal light by 624 GHz or more.

13. A system according to claim 12, wherein the optical frequency of each pumping channel contained in the pumping light is so set as to locate the peak of Raman gain at an optical frequency not separated from the optical frequency of each signal channel contained in the signal light by 1,248 GHz or more.

14. A system according to claim 11, wherein an optical frequency spacing of the pumping channels contained in the pumping light is 4,680 GHz or more.

15. A system according to claim 14, wherein the optical frequency of each of adjacent pumping channels of the pumping channels contained in the pumping light is so set as to locate the peak of Raman gain at an optical frequency separated from the optical frequency of each signal channel contained in the signal light by 624 GHz or more and not separated therefrom by 2,496 GHz or more.

16. A system according to claim 11, wherein when

an optical frequency band of the signal light is 12.48 THz or less, and let m be the number of pumping channels of the pumping light, and n be the number of signal channels of the signal light, the number of pumping channels and the number of signal channels satisfy the following relation:

$m \leqq n/2$.

17. A system according to claim 11, wherein when an optical frequency band of the signal light is 12.48 THz or less, and let m be the number of pumping channels of the pumping light, and n be the number of signal channels of the signal light, the number of pumping channels and the number of signal channels satisfy the following relation:

$m \leqq (n + 4)/2$.

18. A system according to claim 11, wherein a gain spectrum of said Stimulated-Raman-Scattering means has peaks of Raman gain with optical frequencies different from each other derived from the pumping channels contained in the pumping light, and

wherein the optical frequency of each pumping channel contained in the pumping light is so set as to locate the peaks of Raman gain derived from the pumping channels at optical frequencies different from those of the signal channels contained in the signal light.

19. A system according to claim 11, wherein a

gain spectrum of said Stimulated-Raman-Scattering means has peaks of Raman gain which are present at a first optical frequency spacing derived from the pumping channels contained in the pumping light, and

wherein the optical frequency of each signal channel contained in the signal light is set at a second optical frequency spacing, unlike the peak of Raman gain derived from the pumping channels.